

REMARKS

Claims 1-4, 6-30, and 35-37 are pending in the present application. Claims 35-37 are rejected under 35 U.S.C. § 103(a), and claims 1-4 and 6-30 are allowed. The rejections are respectfully traversed in light of the following remarks, and reconsideration is requested.

Further, Applicants include a copy of the Power of Attorney and correspondence change previously submitted. Please address any future correspondences in the above matter to the new address:

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Applicants note that the present Office Action was still sent to the old address and firm of Applicants' attorney.

Rejections under 35 U.S.C. § 103(a)

Claims 35-37 were rejected as being unpatentable over Papasouliotis (U.S. 6,030,881) in view of Perry et al. (U.S. 5,705,419). The Examiner writes, in part:

'881 fails to expressly teach using a hydrogen-plasma chemical etch. Hydrogen plasma etches are well known in the art of semiconductor processing. '419 teaches that the use of a hydrogen plasma (hydrogen bromide) facilitates etching in a partial and controllable manner (see column 5, lines 21-37). The process is expressly taught to prevent formation of stringers (abstract and title). At the time of invention it would have been obvious to one or ordinary skill in the art of semiconductor manufacturing to have modified the process of '881 according to the teachings of '419 and used hydrogen plasma etching as in claims 35-37 of the invention.

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Perry et al. discloses using a hydrogen bromide gas and a chlorine gas to effect the plasma etch. (Perry, col. 5, lines 22-26; col. 7, lines 12-15). Perry also discloses an "etching plasma containing gases such as C₂F₆, CF₄ or CHF₃". (Perry, col. 5, line 66 to col. 6, line 2; col. 6,

lines 46-48). The hydrogen bromide gas with a chlorine gas (HBr/Cl₂) is used for etching polysilicon over oxide. (Perry, Figs. 5, 7, 9E, 9F, 10E, 10F, and accompanying text). It is well known in the art to use HBr/Cl₂ to etch silicon trenches for increased selectivity in etching the polysilicon and to not etch silicon oxide. (See, e.g., ULSI Technology, 1st Ed., 1996, by C.Y. Chang and S.M. Sze at pp. 354 and Silicon Processing for the VLSI Era, Vol. 1, Process Technology, 1st Ed., 1986 by S. Wolf and R.N. Tauber at pp. 557-558). The characteristics of an HBr/Cl₂ plasma do not allow a silicon oxide etch. In fact, Perry et al. specifically disclose, as the Examiner states, the use of hydrogen bromide gas with chlorine gas to avoid formation of stringers by etching polysilicon residue. (Perry, col. 3, lines 39-55). It is the unremoved polysilicon that leads to formation of stringers; thus, stringers are polysilicon. (3:29-32).

In contrast, claim 35 recites, in part, “chemically etching said oxide film in said gap with a hydrogen-based plasma”. Because the plasma etching in Perry is not to chemically etch oxide, as recited in claim 35, but rather to etch polysilicon, the combination of Perry and Papasouliotis does not render obvious claim 35.

Thus, claim 35 is patentable over Papasouliotis in view of Perry because, inter alia, Perry does not teach or suggest “chemically etching said oxide film in said gap with a hydrogen-based plasma”.

Claims 36 and 37 depend on claim 35 and are therefore patentable for at least the same reasons as claim 35.

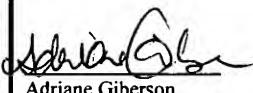
Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a).

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CONCLUSION

For the foregoing reasons, Applicants believe pending Claims 1-4, 6-30, and 35-37 are allowable, and a notice of allowance is respectfully requested. If the Examiner has any questions regarding the application, the Examiner is invited to call the undersigned Attorney at (949) 752-7040.

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Mail Stop Non-Fee Amendment, Commissioner for Patents, Alexandria, VA 22313-1450, on February 10, 2004.


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Respectfully submitted,



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